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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,930	04/13/2005	Ralph Nonninger	26553U	7436
20529	7590	02/17/2006	EXAMINER	
NATH & ASSOCIATES 112 South West Street Alexandria, VA 22314			SANDERS, KRIELLION ANTIONETTE	
			ART UNIT	PAPER NUMBER
			1714	
DATE MAILED: 02/17/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/516,930	<b>Applicant(s)</b> NONNINGER ET AL.	
	<b>Examiner</b> Kriellion A. Sanders	<b>Art Unit</b> 1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 7-9, 13, 15, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claims 7-9, 13, 15, 29 and 20 recite broad recitations to particle size, coat thickness, particle amounts, the extent of mixing and the extent of coating, and the claims also recite "preferable" recitations to particle size, coat

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thickness, particle amounts, the extent of mixing and the extent of coating that are a narrower statement of the original range or limitation.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

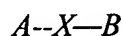
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15, and 20 are rejected as being unpatentable under 35 USC § 103(a) as being unpatentable over Mulvaney et al, US Patent No. 6548168 in view of Oldenburg et al, US Patent No. 6344272.

Mulvaney et al. discloses stabilized nanoparticles having a size of less than about 0.1 microns or 100 nm, that are stabilized by an insulating, semiconducting and/or metallic coating and methods for their production. The particle may comprise a metal, such as copper, silver, gold, platinum, or a metal compound or alloy such as a metallic sulphide, a metallic arsenide, a metallic selenide, a metallic telluride, a metallic oxide, a metallic halide or a mixture thereof. Preferred particles are semiconductor nanoparticles. Examples of semiconductor nanoparticles include cadmium sulphide (CdS), germanium (Ge), silicon (Si), silicon carbide (SiC), selenium (Se), cadmium selenide (CdSe), cadmium telluride (CdTe), zinc sulphide (ZnS), zinc selenide

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(ZnSe) and zinc oxide (ZnO). The particle is coated with a coating layer. Preferably the coating thickness is between 10 and 30 nm. The coating is bonded to the particle through a bifunctional ligand of the formula:



*wherein A is a first functional group that attaches to the particle, or to a coating formed on the particle, B is a second functional group that activates the surface of the core particle for nucleation of a coating layer and X is an optional linking group.*

The coating is selected from the group consisting of silica, Se, an organic conducting polymer, a metal, a metal oxide, a metal sulphide, a metal selenide, a metal telluride, and a metal halide. The metal oxide may be selected from the group consisting of titania, zirconia, alumina, zinc oxide, tin dioxide, or manganese oxide. The source of coating may be a metal sulfide selected from the group consisting of CdS and ZnS. The source of the coating may be a metal selenide selected from the group consisting of CdSe and ZnSe. The source of the coating may be a metal telluride selected from the group consisting of CdTe and ZnTe. The source of the coating may be a metal halide selected from the group consisting of silver iodide (AgI) and silver bromide (AgBr). The source of the coating may be a metal selected from the group consisting of platinum, palladium, iridium, bismuth, copper, silver, gold, and alloys and mixtures thereof. See col. 1, line 22 through col. 5, line 52.

The stabilized particles of Mulvaney et al may be used to produce pigments, paints, fabrics and optics. See col. 8, lines 31-33.

In view of the fact that Mulvaney et al discloses the stabilized pigments to be useful in

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formulating paints, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to formulate a coating composition utilizing the claimed particles. This is particularly true since paints are a type of coating material. Likewise, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to select the most advantageous weight percentages of components from those disclosed within the Mulvaney et al invention to achieve the greatest antimicrobial results as desired. Mulvaney et al discloses that the core material comprises 0.1 to 15 % by weight of the core material. Since the components of the nanoparticles of Mulvaney et al are the same as applicant's it is thought that the core-shell nature of patented and present particles are also the same.

Oldenburg et al discloses core-shell particles or particle mixtures of that may be added to polymers during their preparation by methods well known in the art. Suitable polymers include polyethylene, polyvinyl alcohol (PVA), latex, nylon, teflon, acrylic, Kevlar and epoxy. Claim 11 of the patent specifies the use of acrylics and epoxies. The compositions of the invention are particles that have at least two layers. At least one layer is immediately adjacent to and surrounds another layer. The innermost layer is the core. A layer that surrounds the core is the shell layer. The shell layer is metal-like in that it can conduct electricity and is made of a metal or metal-like material. It is also preferred that the adjacent inner layer to the shell layer be nonconducting. Specifically contemplated are nonconducting layers made of dielectric materials and semiconductors. Suitable dielectric materials include but are not limited to silicon dioxide, titanium dioxide, polymethyl methacrylate (PMMA), polystyrene, gold sulfide and macromolecules such as dendrimers. In certain embodiments of the invention, the nonconducting layer is comprised of a semiconductor material. For example, core particles may be made of

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CdSe, CdS or GaAs. In spherical embodiments, the particles have a homogeneous radius that can range from approximately 1 to 10 nanometers to several microns depending upon the desired absorbance maximum of the embodiment. The conducting shell layers of the invention have thicknesses that range from approximately 1 to 100 nm.

The core-shell particles of Mulvaney et al and Oldenberg are essentially the same. Many of the components of the particles are equated, such as CDS, CDSe, (for the core) and silver and copper, (for the shell). See Mulvaney at col. 4, line 63 through col. 5, line 6 and col. 5, lines 35-40 and col. 7, lines 48-49.

In view of the teachings of Oldenburg et al, it would have been obvious to form the core-shell particles wherein the shell layer is directly deposited on the core layer since such a process is well known in the art. See col. 4, line 63 through col. 5, lines 40.

See col. 3, line 35 through col. 8, line 30 and Examples IV and V.

4. Claims 16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mulvaney et al, US Patent No. 6548168 in view of Oldenburg et al, US Patent No. 6344272 as applied to claims 1-20 above, and further in view of West et al, US Patent No. 6428811.

5. West et al teaches the well known process of producing core-shell nanoparticles having a titanium dioxide core and metal (e.g. silver) shell produced by redux reaction followed by UV radiation. This being a conventional process would have been an obvious choice of production for the ordinary practitioner of this art at the time of applicant's invention. See col. 10, line 53 through col. 11, line 41, col. 12, line 61 through col. 13, line 11 and claim 1. West et al is equivalent to WO 9946351 cited in applicant's foreign search report.

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6. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not suggest UV irradiation redux reaction, although other types of irradiation are suggested.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kriellion A. Sanders whose telephone number is 571-272-1122. The examiner can normally be reached on Monday through Thursday 6:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kriellion A. Sanders  
Primary Examiner  
Art Unit 1714